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EXAMINER

ARTMAN, THOMAS R

ART UNIT	PAPER NUMBER
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2882

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/596,025	Applicant(s) VOGTMEIER, GEREON	
	Examiner THOMAS R. ARTMAN	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 27th, 2009, has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Both claims have the limitation, “a stationary evaluating unit arranged on a rotatable part of the gantry.” This limitation does not make sense. If the evaluating unit is stationary, then it cannot be part of the rotating unit.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 6, 17, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Schulze-Ganzlin (US 5,514,873; herein referred to as SG).

Regarding claims 1, 19 and 20, SG discloses a detector arrangement (Fig.2) and method of operation, including:

a) at least one detector module 1 having a plurality of detector elements 2 which detect radiation and generate signals indicative of the radiation, where the detector module includes:

b) an electrical unit having a transducer 12 capable of bidirectional communication that generates optical detector output signals indicative of the generated signals, and that processes detector module input signals and supplies the input signals to the detector elements (col.3, lines 9-25 and lines 34-40).

With respect to claims 6 and 17, it is inherent in the structure of SG that the detector elements are formed on a CMOS detector chip.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over SG, as applied to claim 1 above.

With respect to claims 2 and 3, SG does not specifically disclose ADCs and parallel-to-serial converters for the outgoing signals, or DACs and serial-to-parallel converters for the incoming data signals. However, the skilled artisan will readily appreciate that the detector readout of all the elements requires conversion from parallel to serial data streams for output, and detector instructions require parallel conversion from serial data stream input, and that the signal to noise ratio of digital signals is inherently better than analogue signals.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for SG to use DACs, ADCs, parallel-to-serial converters and serial-to-parallel converters in order to reliably manage the large amounts of data, as is common in the radiation detector arts.

With respect to claims 4 and 16, SG does not specifically disclose that the opto-electrical transducer is an LED or laser diode.

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However, these are the most common solid state light sources known in the art, where the laser diode is generally more efficient than the LED by providing more light output for a given bias voltage.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for SG to realize the electro-optic interface with LEDs and/or laser diodes as is known in the art.

Claims 5, 7, 8, 10, 11, 15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over SG, as applied to claims 1 and 20 above, in view of Lemelson (US 4,149,088).

With respect to claims 5, 8, 10, 11, 15 and 21, SG discloses that:

c) the detector module is in a carrier 1 that includes inner space for the electrical unit 12, and

d) the optical signals from the electro-optic transducer are indicative of the signals produced by the detector elements.

Further regarding claims 5, 8, 10, 11, 15 and 21, SG does not disclose the use of optical fibers as the optical conductor medium, particularly as a backplane configuration.

Lemelson teaches the practice of using optical waveguides 13 and 16, Figs.3 and 4, in order to guide the light signals between electro-optic devices. In this way, optical data transmission is routed reliably and efficiently as opposed to allowing the light to freely propagate from the LED or laser diode. Lemelson further discloses that these structures may be designed

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as a backplane, where multiple waveguides may be arranged for routing optical data as desired (col.4, lines 51-60).

Although the light guides of Lemelson are not optical fibers, *per se*, they are known functional equivalents because optical fibers are waveguides, and the Lemelson waveguides efficiently guide the optical data in identical fashion to optical fibers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for SG to use optical fibers, as suggested by Lemelson, in order to reliably and efficiently route optical data signals.

With respect to claim 7, SG does not specifically disclose that the electrical unit is integrated in the at least one detector chip.

Lemelson teaches the practice of integrating electro-optic and electronic devices and circuitry on a common substrate or board, which has the potential to reduce size and cost, since all necessary electrical and optical structures are able to be formed on a common substrate (col.4, lines 38-50).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for SG to integrate the electrical unit in the detector chip, as suggested by Lemelson, in order to reduce size and improve efficiency.

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Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over SG, as applied to claim 1 above, in view of Vekstein (US 5,134,639).

SG does not specifically disclose that the detector module is mounted on a gantry of a CT system.

Vekstein teaches a detector module 18 that is mounted on a gantry 12 of a CT system (Fig.1) that uses bi-directional electro-optic communication between the rotor and stator of the CT system. However, Vekstein uses conventional electrical data collection and transmission between the detector module 18 and the electro-optic emitters 26a-26d, and between the opto-electric receivers 37a-37b and the rotor components.

SG provides a more efficient means of collecting and transmitting data by providing the electro-optic interface within the detector module housing (Fig.2). Vekstein would benefit from the integrated arrangement such that the amount of electrical wires and connections would be significantly reduced by generating the optical signals at the detector module. As is known in the art, the substitution of optical means for wires and other purely electrical means of communication improves bandwidth and reduces the weight of the rotor, thus making the system more efficient to operate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for SG to mount the detector module on a gantry of a CT system, as in that of Vekstein, in order to improve gantry rotation and data transfer efficiencies, as is suggested in Vekstein and as is known in the art.

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Claims 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over SG and Vekstein, as applied to claim 12 above, in view of Lemelson.

With respect to both claims 13 and 18, the prior art combination of SG and Vekstein further results in a detector arrangement and a processing unit (items 23 and 24 of Vekstein) outputting signals to a stationary evaluating unit (item 33 of Vekstein) where all components are optically connected to one another.

However, the above combination does not specifically disclose that the optical connections are an optical fiber infrastructure.

Lemelson teaches the practice of using optical waveguides 13 and 16, Figs.3 and 4, in order to guide the light signals between electro-optic devices. In this way, optical data transmission is routed reliably and efficiently as opposed to allowing the light to freely propagate from the LED or laser diode. Lemelson further discloses that these structures may be designed as a backplane, where multiple waveguides may be arranged for routing optical data as desired (col.4, lines 51-60).

Although the light guides of Lemelson are not optical fibers, *per se*, they are known functional equivalents because optical fibers are waveguides, and the Lemelson waveguides efficiently guide the optical data in identical fashion to optical fibers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the SG/Vekstein prior art combination to use optical fibers for optical means of communication, as suggested by Lemelson, in order to reliably and efficiently route optical data signals.

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Further regarding claim 18, buffer memories are inherent for data communication, regardless of medium (wire, optical, RF, etc.) as is understood in the art.

Response to Arguments

Applicant's arguments with respect to claims 1, 19 and 20 have been considered but are moot in view of the new ground(s) of rejection as required by the amendment.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bregman (US 5,093,879) teaches integrated bi-directional electro-optic connection systems for circuit boards.

Erker (US 4,464,776) teaches optical switching means for detector control.

Hamada (US 6,718,005 B2), Krumme (US 4,259,584) and Guempelein (US 5,535,033) all teach optical means of communication between a rotor and a stator of a gantry of a CT imaging system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS R. ARTMAN whose telephone number is (571)272-2485. The examiner can normally be reached on 9am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas R Artman/
Examiner, Art Unit 2882

Thomas R Artman
Examiner
Art Unit 2882